MB Docket No. 10-263

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December 22, 2010

VIA HAND DELIVERY

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Room TW-A325
Washington, D.C. 20554

Re: *In the Matter of Zoom Telephonics, Inc. v. Comcast Cable Communications LLC,*
File No. CSR-____

Dear Ms. Dortch:

Enclosed are an original and two (2) copies of the Public version of the Answer of Comcast Cable Communications, LLC ("Comcast") in the above-captioned proceeding. The enclosed Public version is filed pursuant to 47 C.F.R. § 76.9 and is subject to Comcast's December 20, 2010 Request for Confidential Treatment.

Comcast is serving a copy of this Public version via overnight delivery to counsel for Complainants.

Please feel free to contact me if you have any questions or need any additional information regarding this request.

Respectfully submitted,

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Counsel for Comcast Cable Communications, LLC

cc: Matthew Berry, Counsel for Zoom Telephonics

REDACTED FOR PUBLIC INSPECTION

BEFORE THE

Federal Communications Commission

WASHINGTON, D.C.

In the Matter of	)	
	)	
Zoom Telephonics, Inc.,	)	File No. CSR-_____
	)	
Complainant	)	
	)	
v.	)	
	)	
Comcast Cable Communications, LLC,	)	
	)	
Defendant	)	

ANSWER OF COMCAST CABLE COMMUNICATIONS, LLC

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December 20, 2010

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v.	)	
	)	
Comcast Cable Communications, LLC,	)	
	)	
Defendant	)	

ANSWER OF COMCAST CABLE COMMUNICATIONS, LLC

Comcast Cable Communications, LLC ("Comcast") hereby responds to the above-captioned complaint ("Complaint") filed by Zoom Telephonics, Inc. ("Zoom").[1] As Comcast detailed in its December 7, 2010 Motion to Dismiss, the complaint is procedurally defective and should be dismissed.[2] In the alternative, as detailed below, the Complaint is substantively without merit and should be denied.

I. INTRODUCTION AND SUMMARY

1. In this dispute, Zoom asks the Commission to decide that a DOCSIS modem manufacturer should have the right to sell a device intended for use in a consumer's home that may not meet the consumer's needs, that may fail to deliver the full service capabilities offered

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[1] *See* Complaint, *Zoom Telephonics, Inc. v. Comcast Cable Communications, LLC*, File No. CSR-_____ (Nov. 29, 2010) ("Complaint").

[2] *See* Comcast Motion to Dismiss, *Zoom Telephonics, Inc. v. Comcast Cable Communications, LLC*, File No. CSR-_____ (Dec. 7, 2010) ("Comcast Motion to Dismiss").

by the consumer's broadband Internet Service Provider ("ISP") and ordered by the consumer, and that is potentially unsafe. Indeed, Zoom asks the Commission to declare that Zoom should never have to submit to or perform straightforward, inexpensive tests designed to avoid those outcomes.

2. Zoom, which manufactures low-cost retail modems, apparently wants to do as little testing as possible to get its devices into consumers' homes as quickly as possible. But at the same time, it wants Comcast to publicly certify to all Comcast customers that Zoom's DOCSIS modems are "approved" for use by Comcast, will perform effectively and safely on Comcast's systems and in customers' homes, and are "welcome on the Comcast network." The question here is whether a manufacturer has the right to insist that Comcast publicly certify its DOCSIS modems, embedded multimedia terminal adapters ("eMTAs"), or any other DOCSIS device needed to access broadband Internet service (collectively, "DOCSIS devices") for use with Comcast's network, without Comcast having any assurance that the devices will perform effectively, reliably, and safely to deliver Comcast's various services to its customers.[3]

3. The question in this case is plainly *not* whether Comcast is seeking to "erect barriers" for manufacturers seeking to supply retail DOCSIS devices for use on Comcast's network. All of the evidence shows otherwise. In contrast to some broadband ISPs that require customers to use only devices leased from the provider, Comcast actively welcomes customer use of DOCSIS devices purchased at retail. Comcast has certified over one hundred DOCSIS device models over the last decade, including both devices that Comcast has purchased for its

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[3] eMTAs and other multi-function DOCSIS devices include embedded DOCSIS modems that can receive Comcast's High-Speed Internet services, but also support additional functionality such as voice and wireless services.

customers' use as well as devices intended for retail sale to consumers. Today, *over 22 percent* of the DOCSIS modems connected to Comcast's broadband network for use of its High-Speed Internet ("HSI") services are purchased at retail. *Two of Zoom's DOCSIS modems currently available at retail have been certified by Comcast for use on its network, including one certified just a few months ago.*

4. Zoom's objections to Comcast's testing and certification program are without merit. Zoom complains about the fact that Comcast -- like every broadband ISP -- performs network-specific testing and certification for retail and leased modems used with the Comcast HSI service ("DOCSIS testing"). Zoom also complains because Comcast has recently begun supplementing its standard DOCSIS testing for new devices with a discrete number of additional, real-world testing measures, called "physical and environmental testing" ("P&E testing"), in order to ensure that all new DOCSIS devices connected to Comcast's HSI service meet basic performance, reliability, and safety requirements.

5. Zoom asserts that modem-related testing performed by Underwriters Laboratory ("UL"), the Commission, and CableLabs is all that is needed to ensure that its DOCSIS modems work with Comcast's HSI service. That is incorrect. As CableLabs itself notes in the record of this proceeding, there is no certainty that a DOCSIS device that meets just the basic DOCSIS standards will work on any given DOCSIS network. Network-specific DOCSIS testing is necessary to ensure that a particular DOCSIS device is interoperable and functions properly with all the equipment in the network and that the device provides consumers with the speeds that they expect and pay for.

6. Likewise, P&E testing is needed to ensure the performance, reliability, and safety of DOCSIS devices used in consumers' homes. Although the CableLabs and UL testing plans

include some reliability and safety requirements for DOCSIS modems, those plans only test DOCSIS modems at a very basic level in a lab environment. P&E testing addresses performance, reliability, and safety issues under real-world conditions. Comcast first instituted P&E testing over five years ago for certain DOCSIS devices *it purchases*, as a result of its experience addressing service problems with DOCSIS devices, set-top boxes, and other equipment used to access its services.[4] The success of Comcast's P&E testing in addressing service problems -- as well as its experience in responding to customer complaints regarding untested devices in the field -- led Comcast to conclude this past summer that it should perform P&E testing on *all* new generations of DOCSIS devices to be connected to the Comcast HSI network. This has become even more important as customers expand their uses of the Internet and place more demands on their DOCSIS devices.

7. Testing of both Comcast-purchased and retail DOCSIS devices ensures that *every* device that is used to access Comcast's HSI services meets or exceeds the same standards, which means all customers and manufacturers can legitimately have the same expectations. Comcast lists certified devices on its website as "approved" for use with its service, and it is not in consumers', Comcast's, retailers', or manufacturers' interest for that representation to overlook significant performance, reliability, or safety issues. Manufacturers of DOCSIS devices have praised these tests as helping them to improve their products, and Zoom itself recently thanked Comcast for discovering [[ ]] in the context of certifying Zoom's DOCSIS 3.0 modem earlier this year.

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[4] Comcast extended its P&E testing to new generations of DOCSIS modems it purchases almost two years ago.

8. Zoom was the first manufacturer to submit a retail-only modem for Comcast's approval after Comcast extended P&E testing to retail DOCSIS devices. In October, Zoom objected to the P&E testing, and to the potential travel expense of sending Comcast engineers to Zoom's chosen manufacturing facilities in China to conduct the testing. Zoom then stated a further objection to Comcast's well-established DOCSIS testing. As Comcast explained to Zoom, there are no circumstances under which Comcast can waive its long-established DOCSIS testing. However, to facilitate the P&E testing in this case, Comcast offered Zoom the opportunity to conduct the testing independently, in Zoom's own labs, and simply report the results to Comcast, thereby reducing time and travel expenses.

9. The only response that Zoom offered was to file the Complaint. The Complaint signifies that Zoom is not willing to confirm that its retail DOCSIS modem, which it seeks to promote as "certified" or "approved" by Comcast, will, among other things: (i) consistently deliver the service speeds Comcast offers; (ii) operate safely under typical usage conditions; (iii) reboot effectively after a power outage or a planned Comcast network maintenance event; and (iv) not overheat. And in Zoom's case in particular, these are real concerns, since an overheating problem was observed on Zoom's DOCSIS 3.0 modem that Comcast tested earlier this year.

10. Zoom's objections to reasonable, uniform testing run deeper than an objection to Comcast's P&E testing measures. Zoom has not only refused to self-certify its own devices pursuant to Comcast's P&E testing, but has also insisted that Comcast should be required to certify a Zoom DOCSIS modem based on nothing more than its satisfaction of the minimal CableLabs, Commission, and UL certifications. In addition, Zoom has demanded that Comcast not ask CableLabs -- the industry-wide DOCSIS certifying body -- to modify its own testing

requirements to include any new testing of DOCSIS devices, including any form of P&E testing. In short, Zoom wants to stymie the continued evolution of the DOCSIS standard, regardless of whether improved and updated standards and testing might better protect consumers and improve the reliability, performance, and safety of DOCSIS products. Zoom wants to avoid anything but the most basic of testing, and shift to consumers and broadband ISPs the performance, reliability, and safety risks and costs that any responsible manufacturer should bear itself.

11. The Commission should deny Zoom's requests for relief and its quest to force Comcast to issue a certification that would help Zoom place untested, potentially flawed devices in the homes of Comcast's customers. Granting Zoom the relief it requests would effectively prevent Comcast and other broadband ISPs from conducting many of the tests that enable Zoom's modems to work in the first place. And while the question of whether a broadband ISP should be able to conduct P&E testing to ensure that DOCSIS devices are safe and reliable may be a matter of first impression for the Commission, such testing is a basic consumer protection measure that is fair for all parties, applies equally to wholesale manufacturers who supply DOCSIS devices to Comcast and other broadband ISPs, and is entirely reasonable.

12. Finally, as set forth below, Zoom's various legal claims are without merit:

- Comcast's testing and certification program does not violate the Commission's navigation device rules because DOCSIS devices such as Zoom's modems, which are used to access Title I broadband Internet services, are not subject to the navigation device rules. In any event, Comcast's testing and certification program for such devices would be consistent with the Commission's navigation device rules.

- Comcast's testing and certification program does not violate the Commission's open Internet principles. Comcast's customers can attach any non-harmful device to the network via the DOCSIS device. Comcast is within its rights to ensure that the DOCSIS device, which directly interacts with the network, is not harmful either to the network or to consumers, and does not otherwise impair the service.

13. Comcast has previously urged the Commission to dismiss the instant Complaint due to a demonstrated lack of candor by Zoom and its counsel. Comcast reiterates that request, and also presents the merits of its position. This agency, given its important consumer protection role, should not tolerate the position taken by Zoom. Although Comcast is glad to consider appropriate modifications to its testing -- and is open to having such testing conducted by a third party (such as CableLabs) or by modem manufacturers themselves (under specified conditions) -- it is not in the public interest for the Commission to bar or restrict any testing that will make DOCSIS devices work reliably and safely. For all of the foregoing reasons, and those set forth below, the Commission should deny Zoom's Complaint.

II. COMCAST'S TESTING AND CERTIFICATION PROGRAM ENSURES THAT DOCSIS MODEMS INTEROPERATE WITH COMCAST'S HIGH-SPEED INTERNET SERVICE AND PERFORM SAFELY AND RELIABLY FOR COMCAST'S CUSTOMERS.

14. Zoom's Complaint seeks to eviscerate, or eliminate entirely, any testing and certification program a broadband ISP uses to ensure that the modems that consumers purchase at retail function properly with its network and work safely and reliably with its Internet services and any other services provided over the same network. As detailed below, granting Zoom's request to essentially eliminate all broadband ISP testing would result in profound consumer harms, would undercut consumer confidence in modems purchased at retail, and would retard the growth and deployment of advanced broadband technologies and services designed to help achieve the Commission's policy goals of faster broadband speeds and reliable performance.

A. DOCSIS Testing Ensures That DOCSIS Devices Work on Comcast's Network, and Reliably Deliver the Internet Services Customers Purchase.

15. Most consumer electronics devices -- e.g., gaming consoles, Internet-enabled DVD players and TVs, personal computers and netbooks -- connect to broadband Internet service via the modem, whether a stand-alone modem such as Zoom offers or a modem built into

a multipurpose device such as an eMTA. The modem connects directly to the high-speed Internet service; in fact, until a modem is attached, the consumer has no Internet service.[5] Zoom asserts that the testing by the Commission, UL, and CableLabs is all that is necessary to ensure that modems will work on a broadband ISP's network.[6] That is incorrect. Although CableLabs tests a device for compliance with the basic DOCSIS specification and basic interoperability with other DOCSIS equipment, it does not certify that the device will perform acceptably (or even at all) on a particular network. As CableLabs itself makes clear, "The CableLabs Certification/Qualification process determines equipment compliance with the Specifications. [It] *does not test for performance, quality, or other subjective characteristics.*"[7]

16. The DOCSIS specification permits multiple implementations, and broadband ISPs utilize a broad array of equipment from multiple vendors, which use their own implementations of the DOCSIS specification. Moreover, each piece of vendor equipment allows for a range of possible configurations, thereby enabling each broadband ISP to set its own, network-specific characteristics and performance requirements. For example, Comcast has deployed Cable Modem Termination Systems ("CMTSes") from three different manufacturers -- Cisco, Arris,

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5 *See* Declaration of Joseph Carfagno ¶ 5 ("Carfagno Decl.") (attached as Exhibit 1).

6 *See* Complaint ¶ 46.

7 *See* CableLabs, *Certification Wave Requirements and Guidelines* 4 (Revision 34 Aug. 2010) (emphasis added) ("*CableLabs Certification Wave Requirements*"), *available at* http://www.cablelabs.com/cablemodem/downloads/DOCSISCertWaveGuidelines.pdf.; *see also* Letter from Lee Zieroth, Senior Vice President & General Counsel, CableLabs, to Jason Livingood, Comcast 2 (Dec. 16, 2010) ("CableLabs Letter") (attached as Exhibit 2) ("Since DOCSIS equipment requirements differ among cable operators, CableLabs only performs the specification-related testing for DOCSIS modems and leaves the operator-specific-related testing to the operators.").

and Motorola -- and each of these CMTSes may have more than one software version operating in the network.[8] DOCSIS devices must be tested against each of these versions.[9]

17. As a result, Comcast and every other broadband ISP must perform its own, network-specific testing and certification to ensure that a particular DOCSIS modem is interoperable and functions properly with all the equipment in their network, and to assess which tiers of service the modem will be able to deliver. Broadband ISPs also must test to ensure that the device configuration files work as expected. Comcast's testing of modems for this basic functionality is known as DOCSIS testing.[10]

18. DOCSIS testing, which is performed in Comcast's lab facilities, covers a number of different aspects of a DOCSIS device, including many that CableLabs would not have occasion or reason to test.[11] For example, Comcast's DOCSIS testing includes:

- **Provisioning Tests** -- These tests ensure that the appropriate information -- contained in "bootfiles" -- can be properly loaded onto and interpreted by the customer's device. These bootfiles provide the device with the necessary information to operate on the network. A DOCSIS device that cannot receive or correctly interpret the bootfile will not function.

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[8] *See* Carfagno Decl. ¶ 31.

[9] *See id.*

[10] Zoom correctly notes that Comcast's DOCSIS testing costs $25,000. *See* Complaint ¶ 49. Fees for this testing program merely help defray some of the costs associated with testing devices and do not generate a profit. As Zoom has acknowledged, a "company seeking certification" from Comcast should be "willing to pay a *reasonable* Comcast certification fee (currently $25,000)." *Id.* Ex. 4, at 2 (emphasis added).

[11] *See generally* Comcast Cable, *DOCSIS Cable Modem Requirements v1.1* (July 9, 2009) ("DOCSIS Testing Plan") (attached as Exhibit 3). Over the past year, Comcast has taken significant steps to improve and expedite its DOCSIS testing program. Of particular note, Comcast has expanded its test facilities substantially, doubling the number of test beds. With the expansion of Comcast's DOCSIS test facilities, the additional test beds give Comcast the capacity to test more devices at any one time and more flexibility as to when certification waves begin. *See* Carfagno Decl. ¶¶ 42-43.

- **Secure Software Download Tests**-- These tests ensure that new firmware upgrades can be securely and successfully download to the device. These firmware downloads are a cost-effective way to deploy maintenance updates and upgrades that will allow the customer automatically to receive better service quality and higher speeds as Comcast increases the speed of a given service tier.

- **Performance Tests** -- These tests measure the maximum upload and download speeds that can be achieved by a particular device. CableLabs does not test performance, quality, or other subjective characteristics, so these tests are necessary to ensure that a device is capable of delivering the performance and throughput levels that our customers have purchased.[12] Comcast has been an industry leader in deploying DOCSIS 3.0 and the speeds that technology offers -- e.g., Comcast's Extreme-105 service tier, which provides downstream speeds of up to 105 Mbps -- and these tests are essential for ensuring that devices connected to Comcast's service can support the speeds customers purchase.

- **IPv6 Tests** -- These tests ensure that IPv6-capable devices are able to properly operate on the Comcast network in IPv6 mode, and more importantly, that such devices are capable of operating in conjunction with equipment that is not yet IPv6 capable. These interoperability tests ensure proper device and network operation as well as quality of service and appropriate levels of performance. As the global pool of legacy IPv4 addresses is expected to be exhausted in 2011, this is a critical set of tests that will ensure that the device can function with the next version of IP addressing rather than becoming unusable when this transition begins.

- **Stability Tests** -- These tests ensure that the device is able to properly recover from various events, such as a "soft" reboot (i.e., resetting the device without powering down), that occur as part of normal network operation. The device must reestablish a connection with the network within five minutes of such an event in order to ensure that the customer is not without service for prolonged periods.

- **Dynamic Channel Change Tests** -- These tests ensure that Comcast's HSI network can effectively command the device to move from one downstream and/or upstream frequency to another. If this capability does not work properly, the customer could experience degraded service or a service outage.[13]

- **Operation Systems Support (OSS)/Embedded Host (eHOST) OSS Tests** -- These tests ensure that the device replies properly when queried for operational information

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12 *CableLabs Certification Wave Requirements and Guidelines*, *supra* note 7, at 4.

13 The Dynamic Channel Change mechanism also supports a cost-effective method for determining if more network equipment needs to be purchased to provide proper and cost-effective bandwidth utilization in the network, ensuring proper capacity and performance to the customers. *See* Carfagno Decl. ¶ 22.

by the network. These responses are used to determine the real-time status and condition of the device, as well as to verify that a "self-installed" device is working properly. Inaccurate data would hinder Comcast's ability to monitor the health of the network and diagnose possible service issues.

- **Radiofrequency ("RF") Capability Tests** -- These tests ensure that the device complies with the appropriate DOCSIS-level RF capability standards as described in the DOCSIS specification and as implemented on Comcast's network. The DOCSIS specification gives each network operator some flexibility to choose which frequencies to use to transmit data. Comcast must perform these tests to verify that the DOCSIS device can select the proper frequencies, and to provide a consistent and predictable registration behavior to negative RF events, ensuring service availability and appropriate device performance.[14]

19. Comcast's testing has found numerous instances where a device that has passed CableLabs' testing nevertheless has failed aspects of Comcast's DOCSIS testing.[15] For example, Comcast's DOCSIS testing discovered that [[

]][16] As a result, [[

]][17]

20. In another example that involved Zoom's DOCSIS 3.0 modem -- which Comcast tested and certified earlier this year -- Comcast's DOCSIS testing discovered that [[

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[14] *See generally id.* ¶¶ 15-26 (describing DOCSIS testing).

[15] *See id.* ¶¶ 34-39.

[16] *See id.* ¶ 39.

[17] *See id.*

]] Downtime of more than five minutes would, at a minimum, inconvenience customers and could create serious problems for a Comcast customer who uses an over-the-top Voice-over-Internet-Protocol service and who may find herself unable to make an emergency call.[18] Lengthy downtimes would also almost certainly result in a large number of customer service calls to Comcast asking about the service outage.[19]

21. Zoom has acknowledged previously that Comcast's DOCSIS testing is important "to be sure that [Zoom's] customers [are] able to successfully use its cable modem with" a particular operator's network.[20] Yet in its Complaint, Zoom opposes Comcast conducting *any* tests that would discern -- and help a manufacturer address -- problems in advance of that device being made available to customers. Consumers today are more reliant than ever on broadband Internet service, and they look to Comcast to make sure they get the service they purchase, safely and reliably. DOCSIS testing is one of the ways Comcast makes sure it is meeting its customers' expectations.[21] It is incumbent upon Zoom to explain why it is in the public interest to eliminate

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[18] *See id.* ¶ 48. Zoom asserts that this stability testing is unnecessary because a modem stays connected to the network for months or even years. *See* Complaint ¶ 57. That is incorrect. Comcast's experience is that a typical DOCSIS modem stays connected to the network an average of about 30 days. *See* Carfagno Decl. ¶ 49.

[19] Comcast did not test to see how much *more* time, after the five-minute mark, the modem needed to re-register itself.

[20] *See* News Release, Zoom Telephonics, Inc., *New Zoom DOCSIS 3.0 Modem Ships To 2,600 U.S. Retail Stores* (June 29, 2010), http://www.zoomtel.com/about/20100629_5341_Cable.pdf.

[21] Contrary to Zoom's claims, *see* Complaint ¶¶ 49, 58, 60, Comcast conducts DOCSIS testing promptly and efficiently. Our DOCSIS testing takes anywhere from one to four weeks depending on the number of devices being tested at any one time. For example, since June 1, 2010, when Comcast expanded its test facilities, Comcast has run 24 different certification "waves" covering 91 devices, including DOCSIS modems, eMTAs, and other equipment. *See* Carfagno Decl. ¶ 44. The average time required for Comcast to complete DOCSIS laboratory tests was slightly more than 13 days, *see id.*, not the 6 weeks Zoom claims, *see* Complaint ¶ 49. Zoom also is incorrect in stating that Comcast placed a "hold" on the testing of Zoom's DOCSIS 3.0 modem. *See id.* ¶ 56. Comcast started testing Zoom's modem as part of the certification wave that began April 1, 2010, which was the very next certification wave following Zoom's submission of test modems in March. *See* Carfagno Decl. ¶¶ 45-46. The scheduling of the
(footnote continued...)

such testing, or why the public would be served by purchasing a Zoom modem "certified" by Comcast that may work poorly -- or not at all -- on Comcast's network.

B. Physical & Environmental ("P&E") Testing Ensures That Modems Perform Safely and Reliably on Comcast's HSI Network.

22. In addition to DOCSIS testing, Comcast conducts P&E testing on DOCSIS devices.[22] Although FCC, CableLabs, and UL testing include some safety and reliability requirements for DOCSIS devices, those plans only test devices at a very basic level in a lab environment.[23] Comcast's P&E testing is much more comprehensive, and tests whether a device will work reliably and safely when deployed in the real-world environments in consumers' homes and offices.

23. This is obviously a legitimate concern for the DOCSIS devices that Comcast purchases for resale or lease, but it is equally a concern for retail DOCSIS devices that Comcast is asked to certify -- a public pronouncement that consumers, retailers, and manufacturers understand as a statement of approval from Comcast. Zoom's retail sale of a modem or other DOCSIS device is a one-time transaction; in contrast, Comcast is engaged in an ongoing relationship with the customers who use those devices. Customers turn to Comcast first to address safety, reliability, and performance issues that may arise in the use of their DOCSIS

(...footnote continued)

Zoom device in the April certification wave followed the same process for every other device scheduled for that certification wave. *See id.* ¶ 46.

[22] Comcast, *Physical & Environmental (P&E) Test and Evaluation Plan for Customer Premise Indoor Gateway Devices (DOCSIS based eMTA & CM)* (Mar. 4, 2010) ("P&E Test Plan") (attached as Exhibit 4); Comcast, *Test Method: SCTE40 Compliance Tests* (Oct. 6, 2009) ("SCTE40 Test Plan") (attached as Exhibit 5).

[23] *See* Declaration of Charles Cusson, Director of Physical & Environmental Evaluations for Comcast Cable Communications, LLC ¶¶ 8-9 ("Cusson Decl.") (attached as Exhibit 6); *see also* CableLabs Letter, Ex. 2, at 2 (noting that CableLabs' testing is done "in a lab setting and does not test for any physical or environmental variables").

devices, whether those devices are provided by Comcast or purchased at retail. Discrete, narrowly-tailored safety, reliability, and performance assessments help ensure that the devices that consumers buy do what they are supposed to do, reliably and safely -- which ultimately serves consumers, Comcast, retailers, *and* the manufacturer.

24. Comcast first instituted P&E testing for certain DOCSIS devices it purchases for resale or lease over five years ago.[24] The success of Comcast's P&E testing in addressing service problems -- as well as its experience in responding to customer complaints regarding untested devices in the field -- led Comcast to decide this past summer that it should perform P&E testing on *all* new generations of DOCSIS devices to be connected to its HSI network. This has become even more important as customers expand their uses of the Internet and place more demands on their DOCSIS devices. Testing of both Comcast-purchased and retail DOCSIS devices ensures that *every* device that is used to access Comcast's HSI service meets or exceeds the same standards, which means all customers and manufacturers can legitimately have the same expectations. Although Zoom apparently disagrees, Comcast believes that a customer who uses a device purchased at retail to access Comcast's HSI service is entitled to the same high-quality, reliable service it purchases from Comcast as a customer who uses a leased device. It is not fair to subject customers who opt for a retail DOCSIS device to more downtime, more customer service calls, and more frustration, particularly when the risks of such problems can be minimized or eliminated through simple testing and appropriate modifications.

25. P&E testing includes, among other things, testing DOCSIS devices for:

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[24] Comcast initially only subjected P&E testing to eMTAs because it was critical that they work in emergency situations; almost two years ago, Comcast extended this testing program to new DOCSIS modems it seeks to purchase to ensure their safety, reliability, and performance.

- **Overheating** -- These tests ensure that the device does not overheat and cause equipment and service malfunctions, or even fires, in the various operating conditions experienced in customers' homes. Our customers tend to place these devices in entertainment centers, closets, attics, and other relatively contained locations with poor ventilation that can be *significantly* warmer than room temperature.[25]

- **Power Interruptions** -- These tests ensure that the device can withstand interruptions of power of varying durations and measure how long the device will take to reboot after a power outage (a customer will be without Internet service until the device is rebooted even after Comcast's service to the home has been restored). While minimal UL testing evaluates a device's performance using a steady voltage or assuming that a device is turned off after usage, Comcast's P&E testing recognizes that voltage into a device is not always consistent and that users typically do not turn off a device after each use.

- **Interference** -- These tests ensure that the device can operate reliably in an environment where it is in close proximity to other electronic equipment and subject to "everyday" external RF energy fields, such as those caused by mobile phones, cordless phones, wireless game controllers, and even vacuum cleaners.[26]

- **Switched Mode Power Supply ("SMPS") Test** -- These tests are undertaken to ensure that devices that use SMPS will not cause critical failure or danger during brownout conditions.[27]

- **Electrostatic Discharge/Electric Surges** -- These tests ensure that the device operates or recovers properly after experiencing various common occurrences, such as an electrostatic discharge caused by someone touching the device and creating an electrical static surge.

- **Network Impairments** -- These tests relate to the minimum requirements a device needs to have in order to operate correctly in light of the noise, distortions, and other impairments that typically are present in the network at a subscriber's home or outlet. As the signal travels from the primary distribution point, it is modified and amplified numerous times. This degrades the signal. Ensuring that a device can withstand these impairments helps guarantee that the device will perform well in almost any

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[25] *See* Cusson Decl. ¶ 28.

[26] Wireless game controllers, in particular, are commonly used in the vicinity of DOCSIS devices. Accordingly, it is important to ensure that neither the game controllers nor the DOCSIS devices cause problems with a customer's Internet service nor with the gaming device and/or console, especially when, due to the advent of online gaming, game systems increasingly are used in combination with the Comcast HSI service.

[27] Such concerns are particularly acute in several states where Comcast provides HSI service where summertime brownouts are not uncommon.

environment it is deployed, and will ensure that the device does not interfere with other services provided over the same network.

- **Bonded Channel Testing** -- These tests ensure that new DOCSIS 3.0 devices, which use bonded channel technology to increase the throughput available to the end user, can operate reliably and consistently in light of the various environmental factors that they are certain to encounter when deployed in customers' homes and offices. Without these tests, our customers could experience a loss of data throughput during even relatively commonplace environmental changes in our networks.[28]

Comcast does not charge manufacturers for any of its engineers' time to conduct P&E testing, but does ask manufacturers with facilities outside of North America to pay for travel expenses for Comcast's evaluation engineer to oversee testing at their facilities.[29]

26. During the five years that Comcast has conducted P&E testing, it repeatedly has identified significant defects in DOCSIS devices that could have led to interruptions in customers' service or harm to consumers, their property, or Comcast's network.[30] For example, in testing one modem, [[

]][31] In other cases, [[

]][32] And in yet another case, [[

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28 *See id.* ¶ 17.

29 For those manufacturers who assemble their equipment at factories inside the United States, Comcast does not ask for reimbursement of these travel expenses, bearing these costs on our own. Comcast does not currently have the facilities and equipment necessary to conduct P&E testing, and it has proved much more economical for both the manufacturer and Comcast to perform the testing at the manufacturer's facilities. *See id.* ¶¶ 19-20.

30 *See id.* ¶ 14.

31 *See id.*

32 *See id.*

]][33]

27. In fact, even before Comcast formally began P&E testing for retail modems, Comcast engineers performing DOCSIS testing of a Zoom DOCSIS 3.0 modem fortuitously discovered that [[

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]][35] Subsequently, Zoom wrote Comcast thanking its engineers for "the heads-up on this issue," and expressing its "appreciat[ion] that [Comcast] alerted [Zoom] to this issue" and for "the way that [Comcast] handled it."[36] *Zoom's President and CEO thanked Comcast for its professionalism and praised Comcast for "do[ing] a superb job in making sure that Comcast customers will have a good experience."*[37]

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33 *See id.*

34 *See* Carfagno Decl. ¶ 50. At the time, Comcast was not yet performing P&E testing on retail modems.

35 *See* E-mail from Frank Manning, Zoom, to Jason Livingood et al., Comcast 1 (June 24, 2010, 10:59 p.m.) (attached as Exhibit 7) (reflecting an e-mail from Hume Vance, Zoom, to Jason Livingood et al., Comcast (June 24, 2010, 10:48 a.m.)). [[

]] *See* Carfagno Decl. ¶ 50. That is precisely the type of issue that would have been identified in Comcast's P&E testing had Zoom's DOCSIS 3.0 modem actually been subjected to formal P&E testing.

36 E-mail from Hume Vance, Zoom, to Jason Livingood et al., Comcast (May 26, 2010, 8:33 a.m.) (attached as Exhibit 8).

37 *See* Ex. 7, at 1. Zoom failed to attach these e-mails to its Complaint. The Commission should question why Zoom failed to do so, particularly since the e-mails help explain why Comcast extended P&E testing to retail modems.

28. Absent the diligence of Comcast's engineers, Zoom's DOCSIS 3.0 modem would almost certainly have gone on sale in retail stores throughout the country with [[

]], which likely would have led to significant consumer harm, as well as large numbers of customer service calls to *Comcast*. P&E testing has been proven to result in significant improvements in the performance, reliability, and safety of DOCSIS devices. This has benefited not only consumers, but also *manufacturers,* who are given the ability to address real-world performance issues *before* their devices go to market. In fact, as noted above, Zoom itself praised Comcast for identifying an issue that would have been identified in P&E testing because the "test results were very helpful in driving Zoom to a better product."[38] As Zoom acknowledged, "There were some bumps along the way, but we want to underline our appreciation for the improvements in our product *that are a direct result of Comcast testing.*"[39] Other *manufacturers* have similarly favorable views of P&E testing:

- Arris states that: "Comcast provides a broad set of product requirements in order to ensure interoperability, service integrity, and product longevity. The Physical and environmental (P&E) product requirements and test process are a key part of these requirements, and ARRIS believes have contributed to improved products over time. Metrics such as Mean-Time-Between-Failure are key indicators of the product quality and have a direct affect on the consumers' perception of overall service quality."[40]
- Technicolor states that "these and other Comcast requirements have ultimately resulted in products that are more reliable, more robust, and thus less likely to fail. This benefits Comcast, its subscribers, and Technicolor. It is Technicolor's judgment

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38 Ex. 7, at 1.

39 *Id.* (emphasis added).

40 E-mail from Bill Wallace, ARRIS, to Charles Cusson, Comcast (Dec. 20, 2010, 4:05 p.m.) (attached as Exhibit 9).

and belief that the testing is not onerous and does not create undue or unnecessary delay."[41]

- And Ubee writes that: "Over the time period of Physical and Environmental testing many items are uncovered which are not typically observed in ideal operating circumstances. . . . Ubee Interactive has performed Physical and Environmental testing on a number of products and has observed increased quality of each product through the stringent requirements of Physical and Environmental testing."[42]

29. Based on the foregoing, it is beyond dispute that Comcast's DOCSIS and P&E testing requirements are designed solely to ensure that any DOCSIS modem that Comcast "approves" for use on its network works, and performs reliably and safely. Yet, Zoom now seeks to have the Commission "enjoin Comcast from requiring cable modems sold at retail to participate in any Comcast testing unrelated to preventing harm to the network or theft of service."[43] Zoom has not explained why such testing should be prohibited rather than *welcomed* as a reasonable consumer protection measure, or why it has refused even to conduct its *own* testing to ensure that its device would not experience or cause similar problems. Accordingly, the Commission should deny Zoom's requests.

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[41] Letter from Barbara Rosario, Technicolor USA, to Charles Cusson, Comcast (Dec. 2, 2010) (attached as Exhibit 10).

[42] Letter from Maria Popo, Ubee Interactive, Inc. 2 (December 2010) (attached as Exhibit 11).

[43] Complaint at 34; *see id.* at 33 (requesting that the Commission "enjoin Comcast from requiring cable modems being sold at retail to be evaluated in its Physical and Environmental testing regime").